Owner's Manual

SU10KRT3/1X

SmartOnline™ Rack/Tower On-Line UPS System with Parallel Redundancy Capability

Input: 160-280/277-485V AC, 50/60 Hz, 3Ø, 4-Wire + Ground, Wye
Output: User-Selectable 200/220/230/240V AC, 50/60 Hz, 1Ø, 2-Wire + Ground

Not suitable for mobile applications.

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1 – Introduction

Tripp Lite's SmartOnline Rack/Tower On-Line UPS System with Parallel Redundancy Capability provides long-lasting battery backup for data centers, telecommunications, networks, industrial facilities, security, emergency systems and other critical applications that require high capacity, high availability and extended runtime. True on-line operation continuously transforms 3-phase input power into precision-regulated single-phase output to guarantee maximum equipment protection and stability. Built-in parallel redundancy capability combines up to four UPS systems to provide increased capacity (up to 40 kVA) and/or fault tolerance.

2 – Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains instructions and warnings that should be followed during the installation, operation and storage of this product. Failure to comply will invalidate the warranty and may cause serious property damage and/or personal injury.

DANGER! LETHAL HIGH VOLTAGE HAZARD!

All wiring must be performed by a qualified electrician, in accordance with the warnings in this manual and all applicable electrical and safety codes. Incorrect wiring may cause serious personal injury and property damage.

Location Warnings

- Install the UPS system in a well ventilated, temperature- and humidity-controlled indoor environment, away from moisture, temperature extremes, flammable liquids and gasses, sparks, smoke, open flames, corrosive materials, conductive contaminants, dust and direct sunlight.
- Install the UPS system in a level, structurally sound location.
- The UPS system is extremely heavy; be careful when moving the unit. Do not attempt to move the UPS system without assistance.
- Operate the UPS system at ambient indoor temperatures between 0° C and 40° C only, with non-condensing humidity between 0% and 90%. For maximum battery lifespan, maintain an indoor temperature between 15° and 25° C. (Battery lifespan decreases by half for every 10° C above 25° C.)
- Leave adequate space around all sides of the UPS system for proper ventilation. Keep the rear panel of the UPS system at least 30 cm away from the wall or any object that may impede the airflow of the UPS system.
- Do not block, cover or insert objects into the external ventilation openings of the UPS system, or otherwise impede the airflow from the front to the rear of the UPS system.
- Do not place any object on the UPS system, especially containers of liquid. Spilling liquids on the unit or dropping foreign objects into the unit will invalidate the warranty.
- Install the unit in a location where contact with people is minimized.
- Keep all recorded magnetic media, such as diskettes, tapes and cartridges, a minimum of 60 cm from the UPS system. The magnetic field created by the UPS system may erase or corrupt data on those devices.
- For emergency use, install a fire extinguisher rated for energized electrical equipment fires (Class C rating or exact equivalent, with a non-conductive extinguishing agent) near the UPS system.
- Do not mount unit with its front or rear panel facing down (at any angle). Mounting in this manner will seriously inhibit the unit's internal cooling, eventually causing product damage not covered under warranty.

Connection Warnings

- Connect the UPS system directly to a properly grounded, dedicated AC supply circuit. The voltage of the supply circuit should match the input voltage of the UPS system. Confirm that the utility AC input is correctly grounded.
- The UPS system includes an EMI filter. To prevent potential leakage of hazardous current, confirm that the AC supply circuit is securely grounded.
- Confirm that the UPS system is properly grounded before connecting with the utility AC input.
- The UPS has its own internal energy source (battery). There may be hazardous voltage at the output terminals even when the UPS system is not connected to AC power.
- Do not attempt to power pure inductive or capacitive loads with the UPS system.
- Do not open the case. There are no user-serviceable parts inside. Any required installation, service or repair must be performed by qualified service personnel.
- If the UPS system receives power from a motor-powered AC generator, the generator must provide clean, filtered, computer-grade output.
- To avoid electrical shock, make sure the UPS system is completely turned off when moving it from one place to another.
- The UPS system has an optional "Constant Voltage / Constant Frequency" operational setting. For the correct setting and wiring information, contact Tripp Lite.
- Disconnect the UPS system completely from the AC supply circuit before servicing the UPS system. Incorporate an easily accessible disconnect device in the fixed wiring.

- Even after the AC supply circuit is disconnected, there is a risk of dangerous electrical shock when the external battery pack is connected to the UPS system. Disconnect the external battery pack before servicing the UPS system.
- Use of this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly affect its safety or effectiveness is not recommended. Do not use this equipment in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
- Output Protection: An easily accessible disconnect switch must be provided for the AC output circuit (L21-N22). To reduce the risk of fire, connect the output only to a circuit provided with 45 amperes maximum branch circuit overcurrent protection in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.
- Input Protection: To reduce the risk of fire, connect the input only to a circuit provided with 65 amperes maximum branch circuit overcurrent protection in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.

Wiring Warnings

- Refer to all applicable local, state and national codes (including NEC) for appropriate cable size and ratings.
- The UPS system contains hazardous high voltages that have the potential to cause personal injury or death from electric shock.
- The UPS system has its own energy source. The output terminals may be live even when the UPS system is not connected to a utility power source.
- The UPS system must be suitably grounded according to all applicable electrical wiring regulations.
- De-energize all input and output power sources before installing cables or making electrical connections.
- Use flexible cable of sufficient length to permit UPS system servicing.
- Use 75° C minimum copper wire for AC input/output connections.
- Tighten all connections with a torque of at least 2.60 N•m (23 in•lb).
- Confirm that all cables are marked correctly according to their purpose, phase, polarity and diameter.
- Observe proper polarity by connecting negative to negative and positive to positive. Observe proper phase by connecting R to R, S to S, T to T and N to N. Failure to observe proper phase or polarity will damage the UPS system and create a risk of personal injury and property damage.
- Wiring should be performed by trained, qualified electricians only.

Battery Warnings

- Allow batteries to charge uninterrupted for 12 hours after installation.
- There are no user-serviceable parts inside the UPS system. Battery service or replacement must be performed or supervised by qualified service personnel familiar with batteries and the required precautions.
- When replacing batteries, replace only with the same quantity, type and capacity.
- Do not connect or disconnect batteries when the UPS system is operating from the battery supply. Disconnect the charging source prior to connection or disconnecting battery terminals.
- Batteries present a risk of electrical shock from high short-circuit current. Observe these precautions when working with batteries: Remove watches, rings or other metal objects. Use tools with insulated handles. Wear rubber gloves and boots. Do not place tools or metal parts on batteries. Disconnect the charging source prior to connecting or disconnecting battery terminals. Do not short or bridge the battery terminals with any object.
- Hazardous voltage may exist between the battery terminals and ground – test before touching.
- Turn off and unplug the UPS system before performing battery replacement.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic
- Do not dispose of batteries in a fire. They may explode.
- The batteries are recyclable. Refer to local codes for disposal requirements. Do not dispose of batteries except through approved channels in accordance with all applicable local, state and national regulations.
- Tripp Lite offers a complete line of UPS system Replacement Battery Cartridges (R.B.C.). Contact Tripp Lite to determine the specific replacement battery for the UPS system.
- If the UPS system is unused or placed in storage for any length of time, follow the recharging instructions in **Section 11 – Storage and Service** to avoid a permanent loss of battery capacity. Failure to recharge the batteries periodically may cause permanent battery damage. Battery damage caused by failure to follow the recharging instructions will not be covered under warranty.

Note on Labeling

These symbols may appear on the product label:

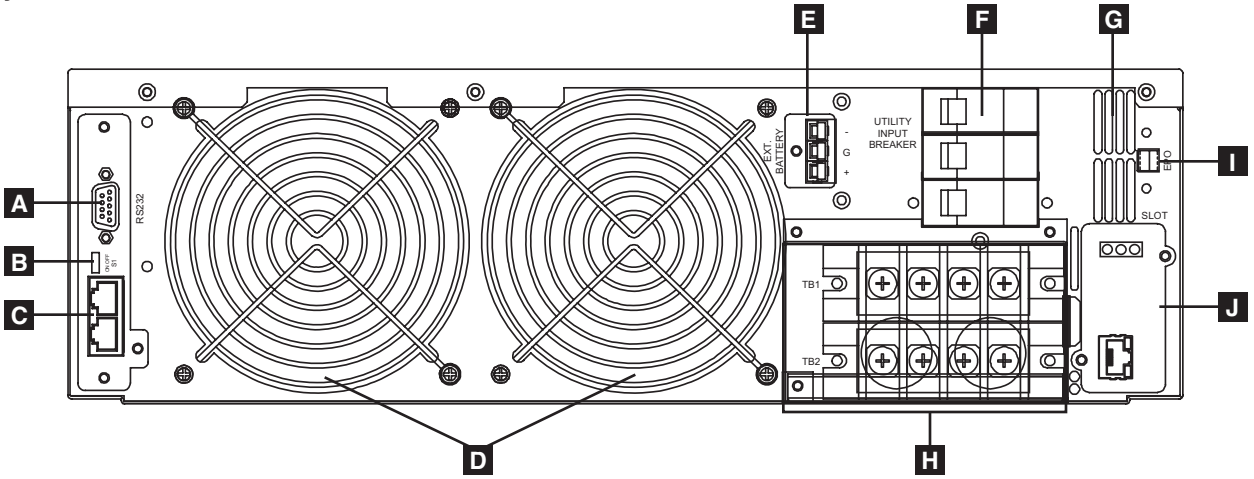
V~	AC Voltage	⏚	Ground
V⎓	DC Voltage	+	Battery Positive
Ø	Phase	-	Battery Negative

Refer to the product label for model numbers, voltage ratings and other important information.

3 – Rear Panel Features

*Note: Refer to **Section 6-1** for a description of the UPS system's control panel.*

UPS System Power Module Rear Panel



A RS-232 Port (Note: Remove the network card in order to use the RS-232 port.)

B Settings Switch for Parallel Redundancy Operation

C CAN Bus Connection Ports for Parallel Redundancy Operation

D Cooling Fans

E External Battery Pack DC Cable Connector

F Utility Input Breaker

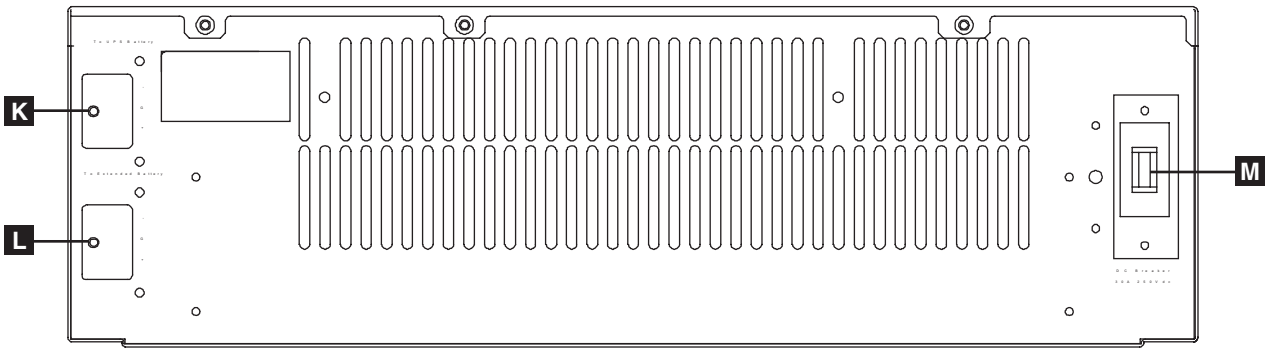
G Ventilation Openings

H Input/Output Terminal Block

I EPO (Emergency Power Off) Connection

J Network Card

External Battery Pack Rear Panel



K UPS Power Module DC Cable Connector

L External Battery Pack DC Cable Connector (For Additional External Battery Packs, Sold Separately)

M DC Breaker

4 – Mounting

Read Section 2 – Important Safety Instructions Before Mounting

Warning: The UPS system is very heavy—be careful when moving or lifting it.

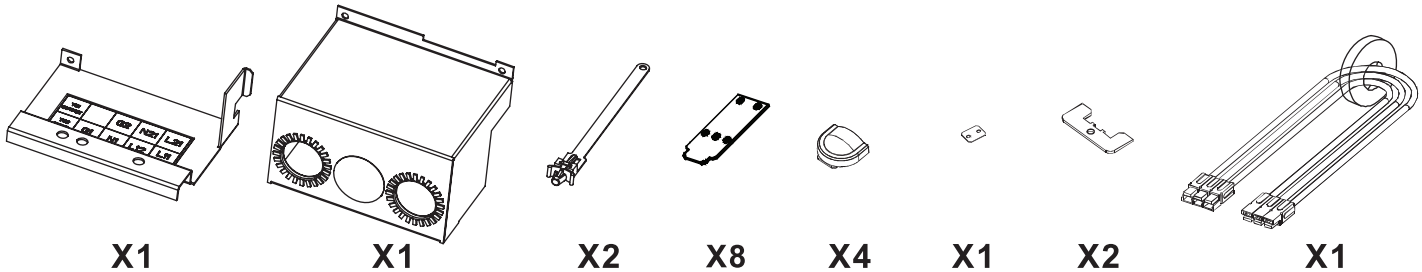
4-1 Unpacking

Remove the protective foam and unwrap the unit. Inspect the unit carefully prior to installation. If anything appears to be damaged, contact Tripp Lite for service. Retain the packing materials for future use.

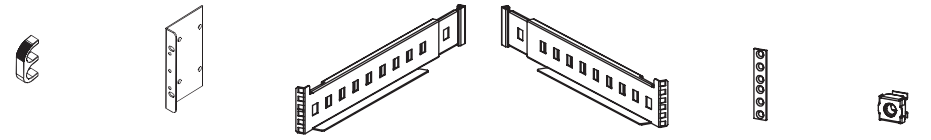
Packing List:

- 1 UPS Power Module
- 1 External Battery Pack
- 1 UPS System Owner's Manual
- 1 Communication Software Kit
- 1 RS-232 Cable
- 1 UPS System Hardware Kit (See below for detail.)
- 1 Parallel Redundancy Hardware Kit (See **Section 7 – Parallel Redundancy Operation** for more information.)

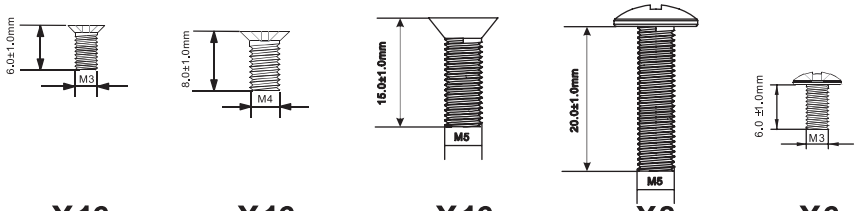
UPS System Hardware Kit



X1 A1 | X1 A2 | X2 A3 | X8 A4 | X4 A5 | X1 A6 | X2 C1 | X1 C2



X4 B1 | X4 B2 | X2 B3 | X2 B4 | X4 B5 | X24 N1



X16 S1 | X16 S2 | X16 S3 | X8 S4 | X6 S5

4-2 Placement

In order to minimize the possibility of damage to the UPS system and maximize its operational lifespan, follow the location warnings listed in **Section 2 – Important Safety Instructions**. Remember to keep at least 30 cm clearance from the rear panel of the UPS system to the wall and do not block any of the UPS system's front or rear ventilation openings.

Warning: The UPS system is very heavy—be careful when moving or lifting it.

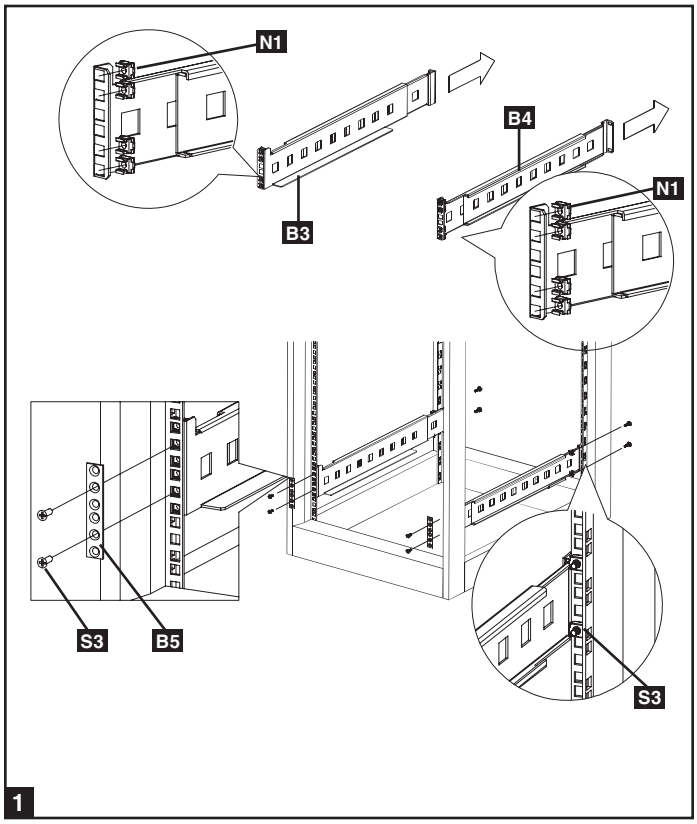
4-3 Mounting (Rack)

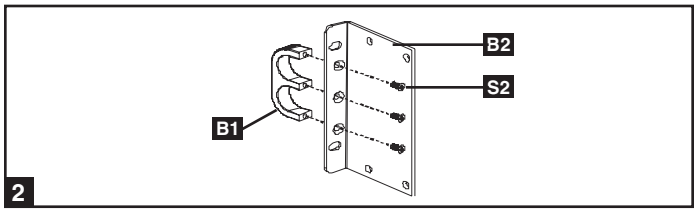
- Use the included rackmount shelves and mounting hardware to mount the UPS system in a 4-post rack or rack enclosure. To mount the UPS system in a 2-post (telecom) rack, order Tripp Lite's 2-Post Rackmount Kit (model 2POSTRMKITWM, sold separately).
- The instructions in this manual are for common rack and rack enclosure types and may not be appropriate for all mounting applications. The user must determine the fitness of hardware and procedures before mounting. If hardware or procedures are not suitable for the application, contact the manufacturer of the rack or rack enclosure for a solution.

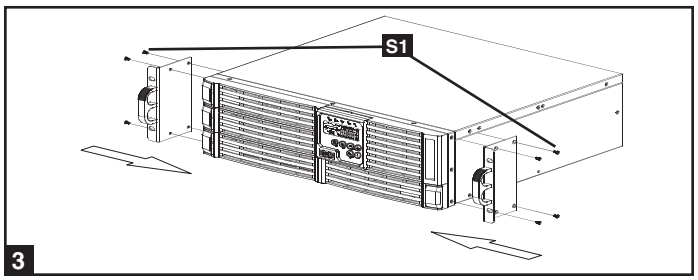
4-Post Mounting Procedure

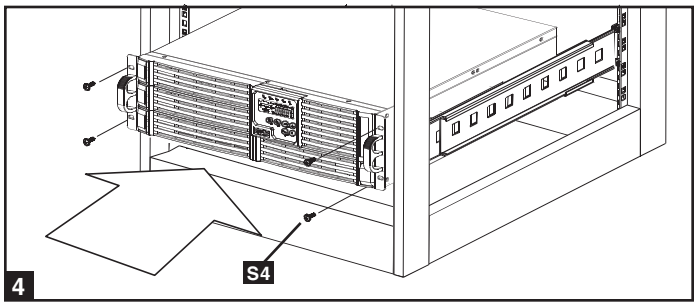
Note: The mounting procedure is identical for the external battery pack and the UPS power module. Mount the external battery pack first, then repeat the procedure for the UPS power module. The external battery pack should be mounted in the lowest available rack space. The UPS power module should be mounted directly above the external battery pack.

1. Adjust the depth of the mounting shelves **B3** and **B4** to fit the rack, then mount the shelves in the lowest available rack space. Insert cage nuts **N1** through the smaller square holes of the shelves, then attach the shelves to the rack's vertical mounting rails. (The shelves should face inward.) Use M5 flat-head screws **S3** for the front and rear vertical rails; use washer plates **B5** for the front vertical rails only. Tighten all screws before proceeding.
2. Use M4 flat-head screws **S2** to attach pulls **B1** to the mounting brackets **B2**.
3. Use M3 flat-head screws **S1** to attach the mounting brackets to the cabinet.
4. With the aid of an assistant, lift the cabinet and place it on the mounting shelves. Insert M5 pan-head screws **S4** through the mounting brackets and into the vertical mounting rails. Tighten all screws securely.









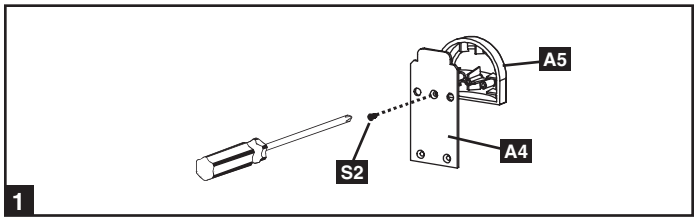
4-4 Mounting (Tower)

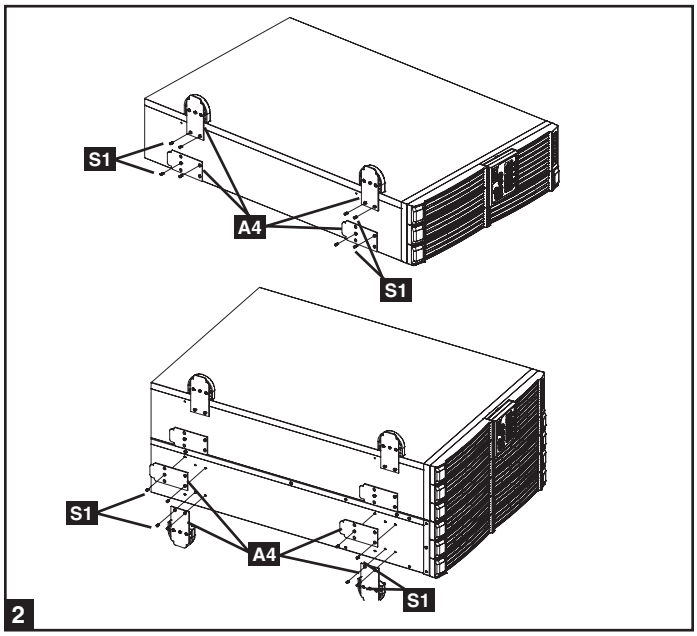
Warning: When mounting the UPS system in a tower position, make sure the control panel is closer to the top of the cabinet than the bottom.

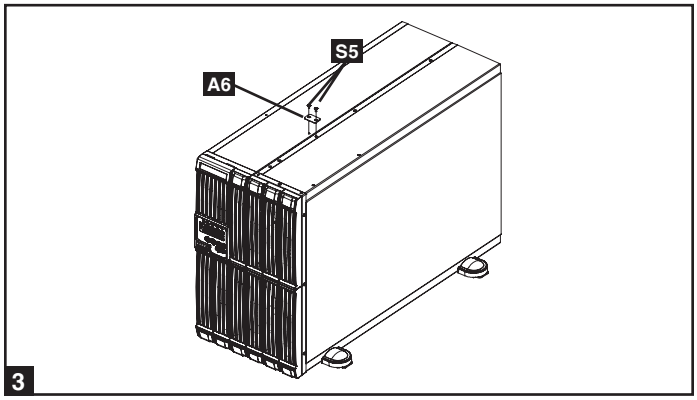
Note: The control panel can be rotated to match the UPS system's position. Pull the panel out slightly, rotate it and push it back into place.

Tower Mounting Procedure

1. Use M4 flat-head screws **S2** to attach covers **A5** to four of the tower feet **A4**.
2. Use M3 flat-head screws **S1** to attach the tower feet **A4** to the UPS power module and external battery pack as shown.
3. With the aid of an assistant, place the cabinets in an upright position. Use M3 pan-head screws **S5** to attach the stabilizing bracket **A6** to the cabinets.







5 – Wiring

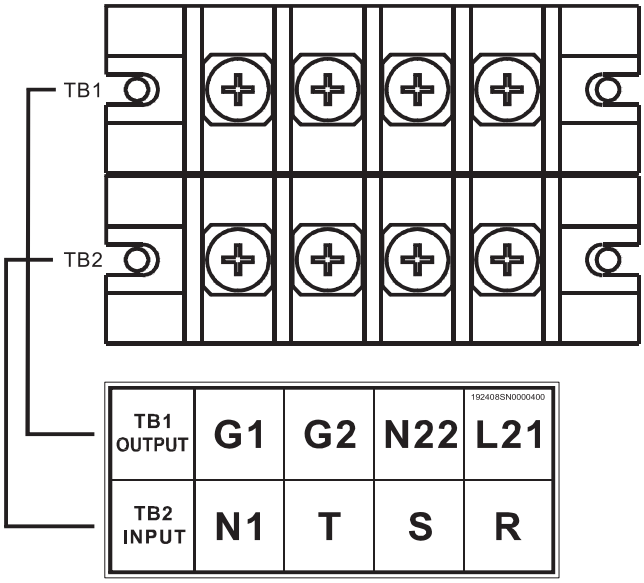
DANGER! LETHAL HIGH VOLTAGE HAZARD!

All wiring should be performed by a qualified electrician, in accordance with the warnings in this manual and all applicable electrical and safety codes. Incorrect wiring may cause serious personal injury and property damage. Read, study and understand the warnings listed in **Section 2 – Important Safety Instructions** before proceeding.

5-1 Wiring Preparation

- De-energize all input and output (AC and DC) of the UPS system and external battery pack.
- Mark all cables according to their correct purpose, polarity, phase and diameter.
- Review the diagram in **Section 5-2** to familiarize yourself with the terminal block.
- Consult the table in **Section 5-3** to find the correct electrical input/output characteristics for the UPS system, including the required input/output cabling. (AC cabling is user-supplied; DC cabling is included.)

5-2 Terminal Block Diagram



R-S-T-N1: Terminals for AC utility input power.
G1: Terminal for UPS system input ground.
G2: Terminal for UPS system output ground.
L21-N22: Terminals for UPS system output.

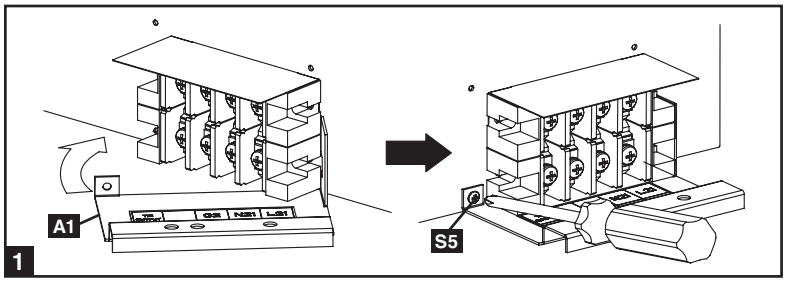
Note: The maximum current for each terminal is 50 amperes.

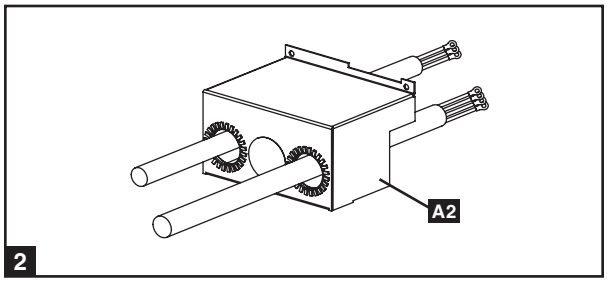
5-3 Electrical and Cable Data

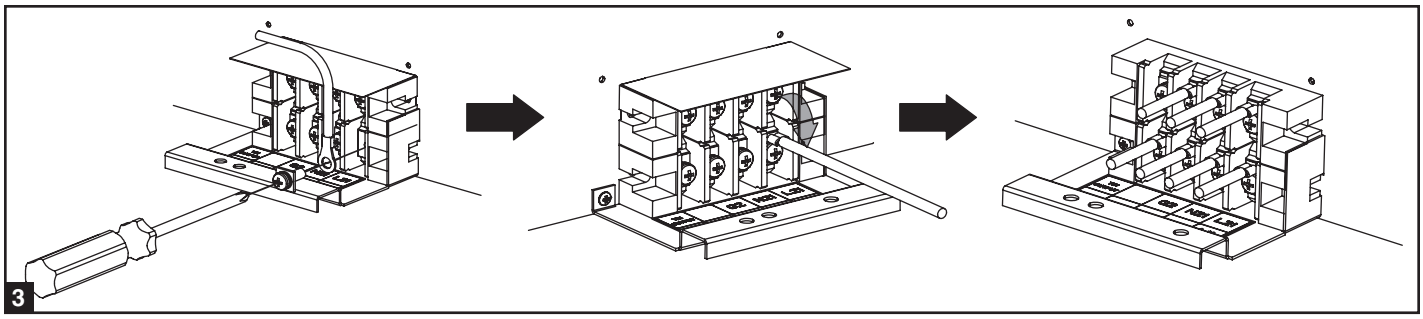
AC Input and Output (75°C Minimum Copper Wire)		
Maximum Current	Conductor Diameter	Torque Force
54.3 amperes	4.6 mm (#6 AWG)	2.60 N•m (23 in•lb)

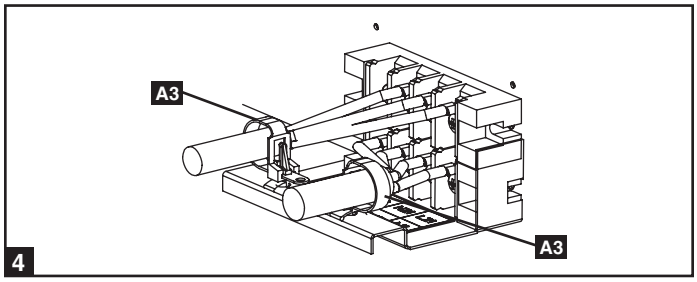
5-4 AC Input/Output Wiring Instructions

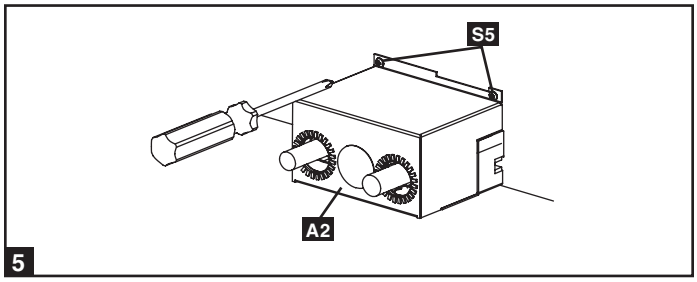
1. Use M3 pan-head screws **S5** to attach the cable attachment tray **A1** beneath the terminal block.
2. Route the AC input/output wiring through cable sleeves and route the cable sleeves through the knockouts in the terminal block cover **A2**. Each input/output wire should terminate with a ring terminal.
3. Connect the ring terminal for each input/output cable to the appropriate input/output terminals. Tighten the terminals with at least 2.60 N•m of torque.
4. Secure the input/output cable bundles to the cable attachment tray with the included mounting ties **A3**.
5. Use M3 pan-head screws **S5** to secure the terminal block cover **A2** over the terminal block.











5-5 External Battery Pack Connection

- **Warning: Do not attempt to connect or disconnect an external battery pack when the UPS system is operating from the battery supply.**
- **Warning: Keep the rear panel of the external battery pack at least 20 cm away from the wall or any object that may impede airflow. (The rear of the power module must be at least 30 cm away from the wall.)**
- **Warning: Each UPS system connected in a parallel redundancy configuration must have the same number and type of external battery packs.**
- **The external battery pack is required to operate the UPS system.**

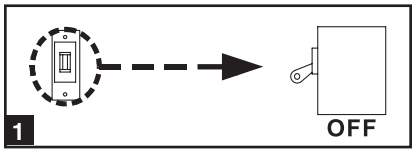
1 Switch the external battery pack's DC breaker to the OFF position.

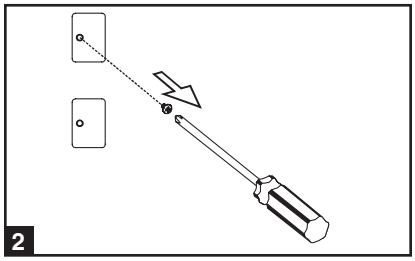
2 Remove the terminal covers from the UPS power module's external battery pack DC cable connector and the external battery pack's UPS power module DC cable connector. Retain the screws removed from the terminal covers.

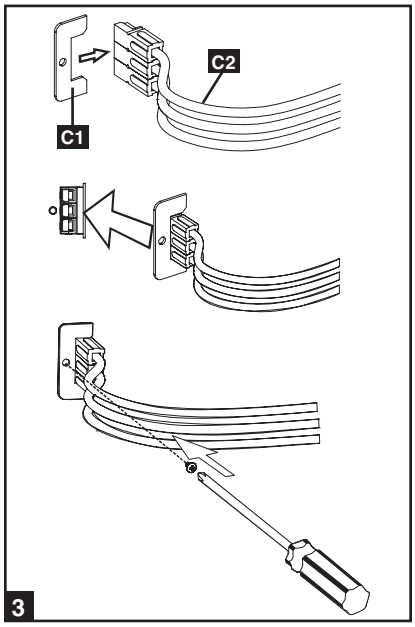
3 Connect one end of the DC cable **C2** to each of the DC terminals exposed in the previous step. Use the screws you removed in the previous step to connect a DC cable bracket **C1** to each end of the DC cable, securing it to each rear panel.

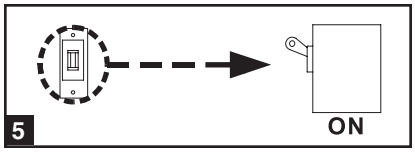
4 Additional external battery packs, sold separately, may be connected to the UPS system for additional battery backup runtime. Contact Tripp Lite customer service to order additional external battery packs.

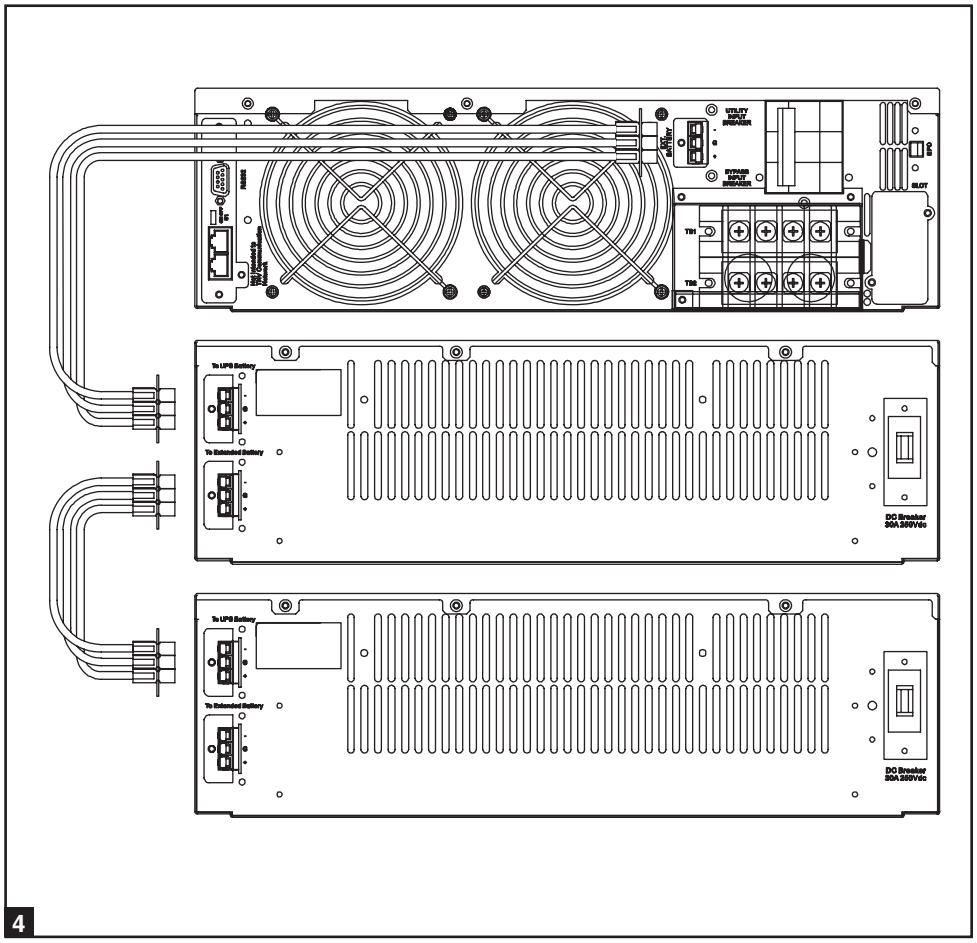
5 Switch the external battery pack's DC breaker to the ON position.





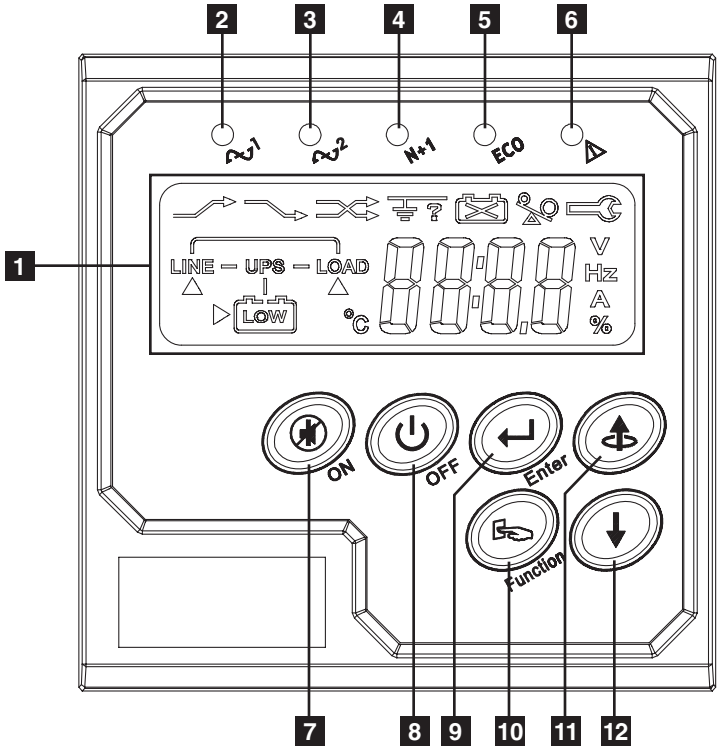






6 – Standard Operation

6-1 Control Panel Features



1 **LCD Screen:** Provides detailed information about operating conditions, UPS system settings and more. See the next page for a description of the LCD symbols.

2 **LINE LED:** This green LED illuminates continuously to indicate the utility-supplied AC line voltage of the AC supply circuit is nominal. It will flash if the line voltage is outside the nominal range (either too low or too high), but still acceptable. User action is not required when the LED flashes; the UPS system continuously and automatically filters AC line power to provide equipment with pure sine wave AC power, regardless of brownout or overvoltage conditions. If this LED is off, then AC line voltage is not present (blackout) or is at an unacceptable level, and the UPS system will provide connected equipment with power from its battery system.

3 **Bypass LED:** If an internal fault or overload occurs, the LED will flash repeatedly to show that connected equipment will receive filtered AC line power, but will not receive battery power during a blackout. In this case, contact Tripp Lite for service.

4 **Parallel Redundancy LED:** This green LED illuminates when the UPS system is operating in parallel redundancy mode.

5 **Economy Mode LED:** This amber LED illuminates when the UPS system is operating in economy mode.

6 **Fault LED:** This red LED illuminates when UPS system experiences a fault or other abnormal condition. If the condition persists after restarting the UPS system, refer to **Section 9 – Troubleshooting**.

7 **"ON" Button:** This button controls these separate functions:

UPS System Power ON
To turn on the UPS system, press this button for approximately one second until the UPS system beeps, then release the button.

Buzzer Silence
To silence the UPS system's buzzer, press this button and hold it until the UPS system beeps, then release the button.

UPS System Cold Start
To use the UPS system as a stand-alone power source when AC power is unavailable (i.e. during a blackout), press this button and hold it until the UPS system beeps, then release the button. See **Section 6-4 – Battery Mode Startup** for more information.

8 **"OFF" Button:** This button turns off power to the UPS system's output. Press this button and hold it until the UPS system beeps, then release it. The battery will continue to charge and the fan will continue to operate even when the output is off. To turn the UPS system off completely, including the battery charger, turn off the UPS system's utility AC input breaker after pressing the "OFF" switch.

9 **"Enter" Button:** This button confirms changes to the UPS system settings.

10 **"Function" Button:** This button allows access to special functions.

11 **Previous/Change Setting Button:** This button returns to the previous page or changes the UPS system settings, depending on the context.

12 **Next Button:** This button goes to the next page.

6 – Standard Operation *continued*

6-1 Control Panel Features *continued*

LCD Symbols

Symbol	Description
LINE	Utility or Bypass Source
	Battery Low
	Battery Abnormal/Fault
	UPS Overload
	UPS Operating in Specified Mode (Normal, Economy, etc.)
	A Transfer to Battery Occurred in the UPS Output
	UPS Failure to Transfer to Bypass or Bypass Abnormal in ECO Mode
	Utility Input Abnormal
OFF	UPS Shutoff
LINE OFF	UPS Abnormal Lock
	UPS Flow Chart
	Alphanumeric display with symbols to indicate measurements of temperature, voltage, amperage, level (percentage) and frequency.
▲ ▶	Indicates the category being measured (line, load, battery).
EPO	Emergency Power Off

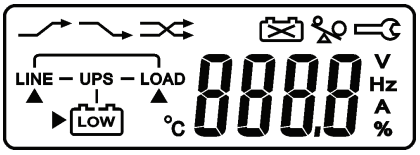
6-2 Control Panel Error Codes

Code	Description
Er05	Battery Weak or Dead
Er06	Output Short Circuit
Er10	Inverter Overcurrent
Er11	UPS Overheat
Er12	UPS Output Overload
Er14	Fan Error
Er15	Wrong Procedure Used to Enter Maintenance Mode
Er16	Error in Parallel System (Output Parameters)
Er17	Single Unit – ID Number Error / Parallel Systems – ID Number Conflict
Er21	Parallel Communication Error (Communication cable disconnected or failure to find ID1 UPS.)
Er27	Normal Mode Required for Parallel Redundancy Operation
Er28	Bypass Overload Timeout (Output Cut Off)
Er31	Control Board and Driver Board Settings Mismatch

6-3 Normal Mode Startup

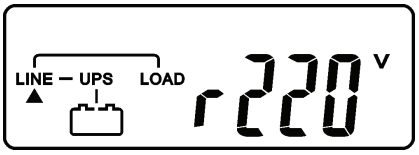
1. Confirm that the UPS system is properly grounded.
2. Make sure the utility AC supply circuit breaker and the UPS system's input breaker are switched off.
3. Wire the utility AC supply circuit and output circuit to the UPS system's terminal block and connect the external battery pack, following the instructions in **Section 5 – Wiring**.
4. Switch on the utility AC supply circuit breaker and the UPS system's input breaker. The green line LED (⏦) illuminates continuously to indicate the utility-supplied AC line voltage of the AC supply circuit is nominal.
5. If the UPS system is operating in a parallel redundancy configuration, the LCD screen will display **A1** then **A2** then **B**. If the UPS system is operating in a standalone configuration, the LCD screen will display **A1** then **B**.
6. The UPS system is now in bypass mode and will automatically proceed to the UPS system self-test.
7. If there are no abnormal/fault/error messages, the pre-startup of the UPS system has been successful and the battery charger begins to charge the external battery pack.
8. Press the ON button ⏻ for approximately 3 seconds, then release it. The UPS will beep twice and the LCD screen will change from **B** to **C**.
9. The UPS system will perform another self-test, and the LCD screen will change from **C** to **D** and switch to battery mode for approximately 4 seconds. If the self-test is successful, the LCD screen will change to **E1**, then **F**. If the self-test is unsuccessful, the LCD screen will change to **E2**, then an error code will be shown. If an error code is shown, refer to **Section 9 – Troubleshooting**.
10. If the self-test is successful, the UPS system startup is complete. Allow the batteries to charge for 12 hours in order to ensure that connected equipment will continue to operate without interruption during a power failure. Once the UPS system is in use, it will charge the batteries and maintain the charge level automatically.

A1



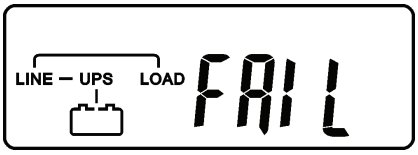
This screen indicates initial startup.

C



This screen shows the line voltage.

E2

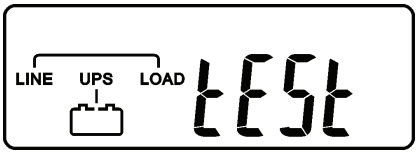


This screen indicates a failed self-test.

A2

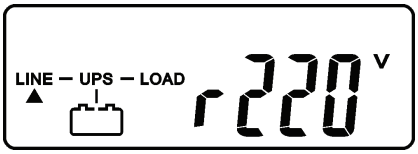
This screen indicates parallel configuration.

D



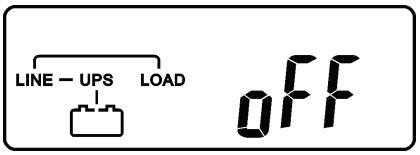
This screen indicates that a test is underway.

F



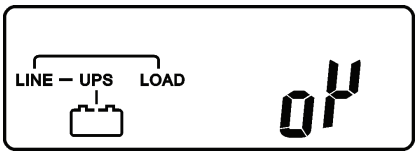
This screen shows the line voltage.

B



This screen indicates the UPS inverter is off.

E1



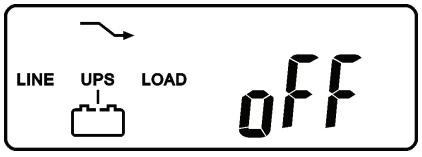
This screen indicates a successful self-test.

6-4 Battery Mode Startup (Cold Start)

The UPS system supports battery mode startup (cold start), allowing it to operate as a standalone power source when AC input power is unavailable.

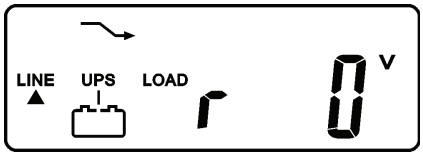
1. Make sure the UPS system is properly installed and the battery is at least partially charged.
2. Some electronic equipment may draw more amps during startup; consider reducing the initial load on the UPS system.
3. Press the ON button for approximately 5 seconds, then release it. The UPS will beep twice and the LCD screen will change from **A** to **G**.
4. Press the ON button again for approximately 3 seconds, then release it. The UPS will beep twice and the LCD screen will change from **G** to **H**. (The UPS system will remain awake for approximately 15 seconds after completing the previous step. If you do not press the ON button again before 15 seconds have elapsed, you will need to repeat the previous step.)
5. The UPS system will run a self-test and display **H** again. Battery mode startup is successful and connected equipment will operate until the battery is depleted (or until pre-defined shutdown parameters have been reached).

G



This screen indicates the UPS inverter is off and utility input is abnormal.

H

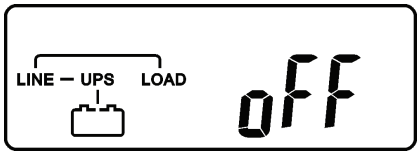


This screen shows the utility input voltage is zero.

6-5 UPS System Shutdown

1. Press the OFF button for approximately 5 seconds, then release it. The inverter output will turn off and the LCD screen will show **B**.
2. Turn off the UPS system's utility input breaker.
3. The UPS system is now completely off. If the UPS system will be turned off for a significant length of time, follow the battery recharging instructions in **Section 11 – Storage and Service**.

B



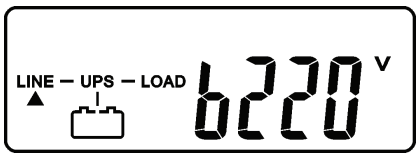
This screen indicates the UPS inverter is off.

6-6 UPS System Settings and Measurements

Checking UPS System Measurements

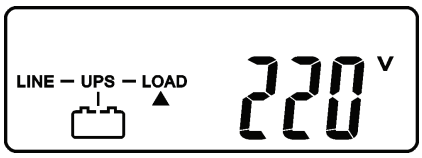
To check the values measured by the UPS, scroll up or down through the LCD panel. Scrolling down will display values in the following order:

I



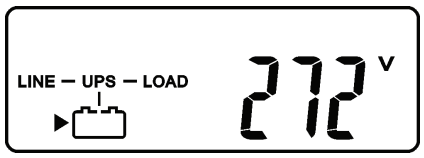
Bypass Input Voltage

L



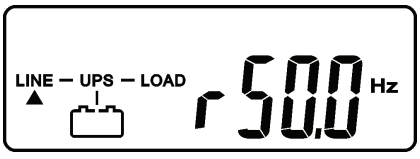
Output Voltage

O



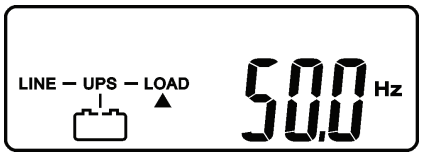
Battery Voltage

J



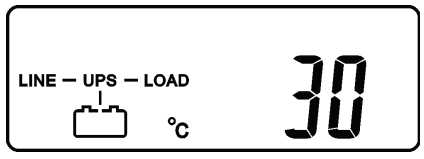
Utility Input Frequency

M



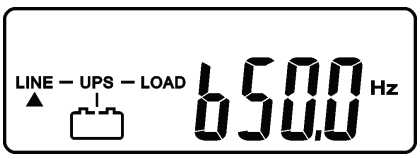
Output Frequency

P



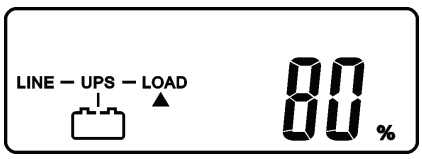
Inner Temperature (°C)

K



Bypass Input Frequency

N



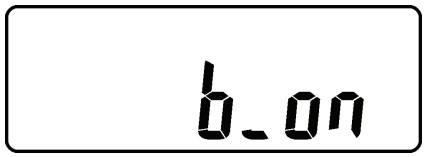
Output Load Percentage

6-6 UPS System Settings and Measurements *continued*

Settings and Special Functions

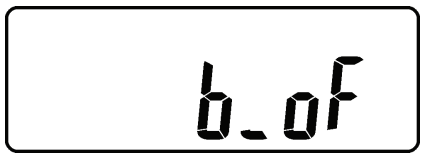
After the UPS starts up completely, press ↵ to view settings and execute special functions. Scroll down ↓ to review the settings. Use the ▲ button to execute special functions. Special functions include buzzer ON **Q1** or buzzer OFF **Q2** and self-test OFF **R1** or self-test ON **R2**.

Q1



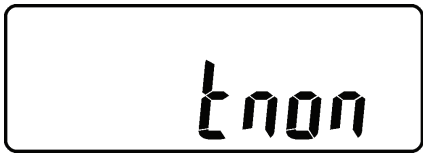
Buzzer “ON”

Q2



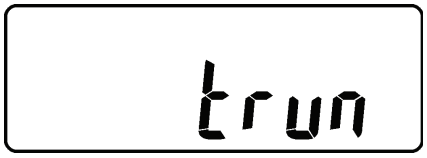
Buzzer “OFF”

R1



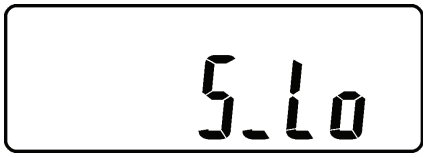
Self-Test “OFF”

R2



Self-Test “ON”

S1



Bypass Acceptance Range #1

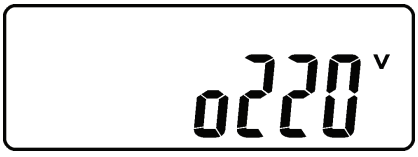
S2

Bypass Acceptance Range #2

T

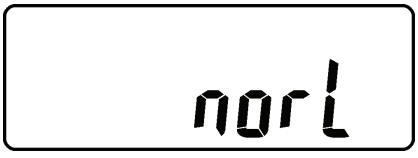
Frequency Tolerance Window

U



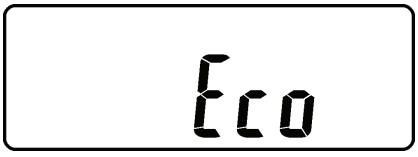
Output Voltage Setting

V1



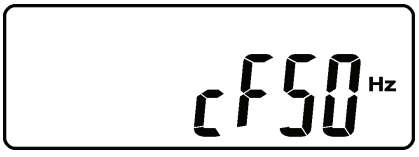
UPS Normal Mode

V2



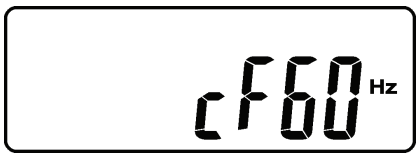
UPS Economy Mode

V3



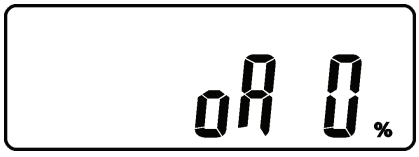
Fixed 50 Hz Output

V4



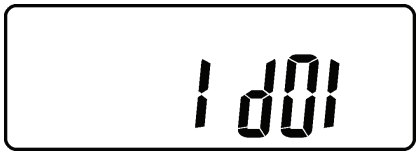
Fixed 60 Hz Output

W



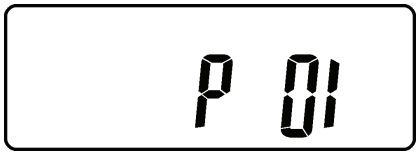
Output Voltage Adjustment (±3%)

X



UPS Identification Number

Y



Parallel Mode Enable/Disable
(P 02 = Parallel Mode Enable)

Changing Default Settings

Make sure the UPS system is OFF **Z**. Press the “ON” button ⏻ and “Next” button ↓ simultaneously for approximately three seconds until the buzzer sounds twice, then release the buttons. Except for buzzer **Q1** / **Q2** and self-test **R1** / **R2**, all other default settings may now be changed by pressing the “Previous/Change Setting” ▲ button. After changing settings, press the “Enter” button ↵ to save all changes **AA**. To cancel all changes, press and hold the OFF ⏻ button for five seconds, then release the button **BB**.

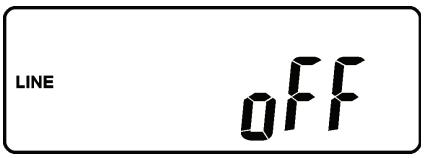
Z

UPS Off

AA

Data Saved

BB



Settings Changes Canceled

7 – Parallel Redundancy Operation (Optional)

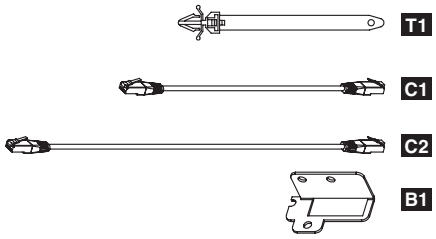
DANGER! LETHAL HIGH VOLTAGE HAZARD!

All wiring should be performed by a qualified electrician, in accordance with the warnings in this manual and all applicable electrical and safety codes. Incorrect wiring may cause serious personal injury and property damage. Read, study and understand the warnings listed in **Section 2 – Important Safety Instructions** before proceeding.

Unpacking the Parallel Kit

The parallel kit should include these parts:

- 2 RJ45 Parallel Communication Cables **C1**, **C2**
- 1 Parallel Communication Bracket **B1**
- 1 Cable Tie **T1**



UPS System Placement

In order to minimize the possibility of damage to the UPS system and maximize its operational lifespan, follow the location warnings listed in **Section 2 – Important Safety Instructions**. Remember to keep at least 30 cm clearance from the rear panel of the UPS system to the wall and do not block any of the UPS system's front or rear ventilation openings.

Warning: The UPS system is very heavy—be careful when moving or lifting it.

Installation

1. To avoid noise interference, install each wire and cable separately to the input, output and battery.
2. Keep all input, output and battery wires and cables away from all connecting wires for parallel functions and control signals, including RJ45, RS-232, RS-485, USB and EPO. If this is not possible, set them at 90° angles or at least 20 cm apart.
3. **Warning: The UPS system includes an EMI filter. To prevent potential leakage of hazardous current, confirm that the AC supply circuit is securely grounded.**

Start-up Procedure

1. Position the UPS systems as specified above.
2. Connect the parallel communication cables **C1**, **C2** to the "Ring" loop at a maximum length of 7 m. Secure the cables with the parallel communication brackets **B1**.
3. Arrange the power cables and the control signal cables according to UPS type. Make sure that all circuit breakers at the input and output ends are set to OFF.
4. For maintenance purposes, you may wish to purchase a manual bypass master panel (optional).
5. Set the terminal resistors of only two parallel UPS systems to the ON position. (For three units in parallel, switch on the terminal resistors of UPS #1 and #3 only. For four units in parallel, switch on the terminal resistors of UPS #1 and #4 only.)
6. Turn on the utility input breaker. Configure each UPS system's operating mode to parallel mode (P 02) and set the IDs (e.g. UPS 1, ID=1) of the respective UPS systems. (**See Section 6-6 – UPS System Settings and Measurements**.) All parallel UPS system parameters except ID number must be same, including the number and type of connected battery packs.
7. If an external manual bypass master panel (optional) is installed, make sure the switch is in the "Bypass" position. Check to see if the UPS system is in bypass mode with output voltage available.
8. Turn on the output breaker and ensure that the connected loads are supplied with power via the manual bypass master panel.
9. Turn on the output breaker of the UPS and turn the switch of the manual bypass master panel to "UPS" position. The connected loads will be supplied with power via the UPS bypass loop.
10. Turn on each UPS system individually and make sure it is in inverter supply (normal) mode. Installation is now complete.

8 – Communications

Note: These connections are optional. The UPS system will function without these connections.

8-1 Network Card

The UPS system includes an internal network card that provides an Ethernet interface for remote monitoring and control of the UPS system. Refer to the network card documentation for additional information. *Note: The network card must be removed in order to use the UPS system's RS-232 port.*

8-2 EPO Connection

Shorting the EPO terminals activates the EPO (emergency power off) function, which provides emergency shutdown of the UPS system.

8-3 RS-232 Serial Communications

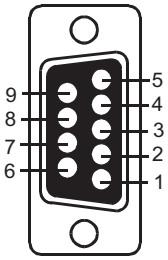
Note: The network card must be removed in order to use the UPS system's RS-232 port.

Use the included RS-232 (DB9) serial cable to connect the UPS system's RS-232 serial port to a computer's RS-232 serial port. Install the included software on the computer in order to monitor and control the UPS system. (See the software documentation for system requirements, installation instructions and additional information.)

RS-232 interface settings:

Baud Rate	2400 bps
Data Length	8 bits
Stop Bit	1 bit
Parity	None

RS-232 pin assignments:



Pin 3: RS-232 Rx
Pin 2: RS-232 Tx
Pin 5: Ground

9 – Troubleshooting

If the UPS system malfunctions during operation, check the following:

- Is the input and output wiring correct?
- Is the utility AC input voltage within the acceptable range for the UPS system?

If problems persists, please refer to the instructions below. If the problem continues to persist after following the instructions below and/or restarting the UPS system, contact Tripp Lite for service.

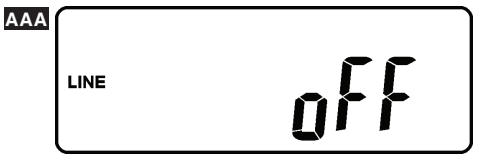
Problem	LCD Screen Error Code	Possible Solution
Fault LED	Er05 + LOW +	Check the battery connection, then recharge the battery for 12 hours. If the problem persists, contact Tripp Lite for service and/or battery replacement.
Fault LED	Er06/Er10/Er12/Er28 +	If the breaker has tripped, turn off the UPS system completely and allow it to cool. Remove some of the load from the UPS output, then reset the breaker and restart the UPS. If any of the wiring appears to be damaged, replace it.
Fault LED	EPO	Remove the EPO terminal short circuit.
Fault LED	Er11/Er33	Remove any objects blocking the ventilation holes. Make sure the UPS location provides adequate ventilation.
Fault LED	Er14	Check the cooling fans on the rear panel. If the problem persists, contact Tripp Lite for service.
Fault LED	Er15	Make sure the UPS is operating in normal mode. If it is operating in CVCF mode, restart the UPS.
Fault LED	Er16/Er27	All parallel UPS parameters except ID number must be same. Adjust the parameters.
Fault LED	Er21	Reconnect the RJ45 cable or set a UPS with ID=1.
Fault LED	Other Error Code	Have a qualified electrician check the AC supply circuit and wiring, then restart the UPS system. If the problem persists, contact Tripp Lite for service.
UPS fails to offer battery backup or backup time is much shorter than calculated.	Not Applicable	Recharge the battery uninterrupted for 12 hours. If the problem persists, contact Tripp Lite for service and/or battery replacement.
UPS locks itself and cannot be turned off.	Not Applicable	Attempt to restart the UPS system (see below). If the problem persists, contact Tripp Lite for service.

UPS Detects Error While in Self-Test Mode

If a serious abnormal condition occurs, the UPS system will lock itself in the "OFF" position AAA and the fault LED will illuminate on the control panel. After three seconds, all messages will be locked except for bypass messages (and). If the AC utility input power becomes abnormal after the UPS locks, the LED will go out and will appear on the LCD.

To release the UPS system lock:

1. Troubleshoot the UPS system problem using the chart above.
2. Press the "OFF" button for five seconds until the buzzer sounds twice, then release the button.
3. Turn off the utility input breaker.
4. Restart the UPS system by following the instructions in **Section 6-3 – Normal Mode Startup**.
5. If the problem persists, contact Tripp Lite for service.



UPS Off

10 – Specifications

Input	
Voltage Range	Up to 160-280/277-485V AC (3Ø, 4-Wire + Ground, Wye) (160-176/277-305V AC at Load < 75%)
Frequency Range	45 to 65 Hz
Power Factor	Up to 0.99 at 100% Linear Load
Output	
Voltage Range	User-Selectable 200/220/230/240V AC (1Ø, 2-Wire + Ground)
Voltage Adjustment	±0%; ±1%; ±2%; ±3%
Voltage Regulation	±2%
Capacity	10 kVA / 7 kW
Rated Power Factor	0.8 Lagging
Wave Form	Pure Sine Wave, THD <3%
Frequency Stability	±0.2% (Free-Running)
Frequency Regulation	±1%; ±3%
Transfer Time to Battery	0 ms
Crest Factor	3:1 Acceptable
Efficiency (AC to AC, Normal Mode)	Up to 91%
Efficiency (AC to AC, Economy Mode)	Up to 93%
Estimated Full Load Runtime	≥ 5 minutes
Estimated Half Load Runtime	≥ 14 minutes
Physical	
Dimensions (H x W x D)	135 x 440 x 680 mm (Power Module)
Input/Output Connection	Hardwire
Unit Weight	28 kg (Power Module)

11 – Storage and Service

Storage

First turn the UPS system's output and utility input breaker OFF, then disconnect the UPS system's input from the AC utility power source. Next, disconnect all equipment. The UPS system must be stored in a clean, secure environment with a temperature less than 40° C and a relative humidity less than 90% (non-condensing). *Note: If the UPS system remains off for an extended period of time, it should be turned on periodically to allow the batteries to recharge. The UPS system should be turned on and the batteries should be recharged at least one uninterrupted 12-hour period every three months in moderate-temperature environments (-15° to 30° C), or every two months in high-temperature environments (30° to 40° C). Failure to recharge the batteries periodically may cause irreversible battery damage.*

Service

The UPS system is covered by the limited warranty described in this manual. Extended and on-site warranty options are also available. For more information, call Tripp Lite Customer Service at +1.773.869.1234. If returning the UPS system to Tripp Lite, carefully pack the UPS system using the original packing material that came with the unit. Enclose a letter describing the symptoms of the problem. If the UPS system is within the warranty period, enclose a copy of the sales receipt.

12 – Battery Replacement

DANGER! LETHAL HIGH VOLTAGE HAZARD!

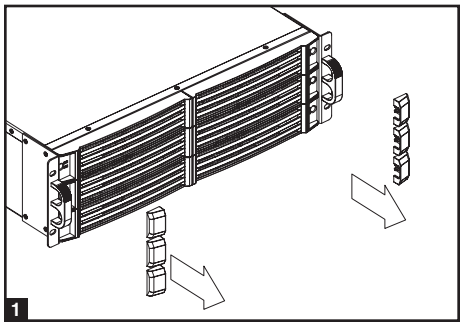
All service, including battery replacement, should be performed by qualified service personnel, in accordance with the warnings in this manual and all applicable electrical and safety codes. Read, study and understand the warnings listed in "Section 2 – Important Safety Instructions" before proceeding.

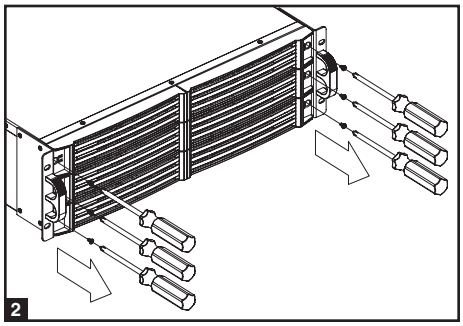
Under normal conditions, the original batteries in the UPS system will last several years. The batteries are designed for hot-swap replacement (i.e. replacement while the UPS system is in ON mode), but some qualified service personnel may wish to put the UPS system in OFF mode and disconnect equipment as an extra precaution before proceeding.

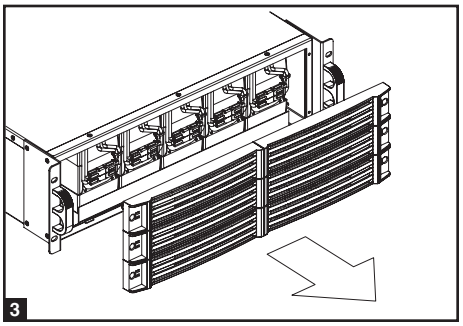
Battery Replacement Procedure

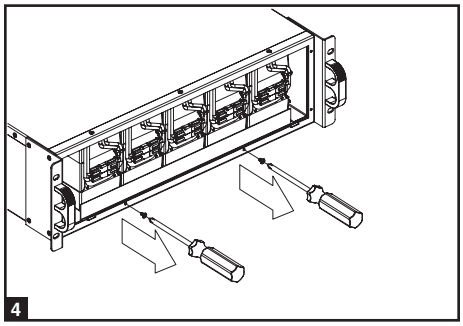
(Follow steps 1-7 to remove old batteries, then reverse the procedure to add new batteries.)

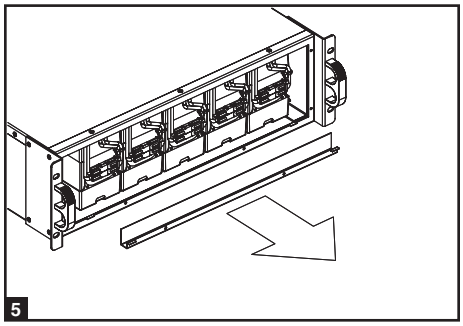
1-3 Remove Front Panel **4-5** Remove Battery Compartment Cover **6-7** Disconnect Old Batteries and Remove/Recycle Old Batteries **7-6** Insert New Batteries and Connect New Batteries (Attach battery connectors black-to-black and red-to-red.) **5-4** Replace Battery Compartment Cover **3-1** Replace Front Panel

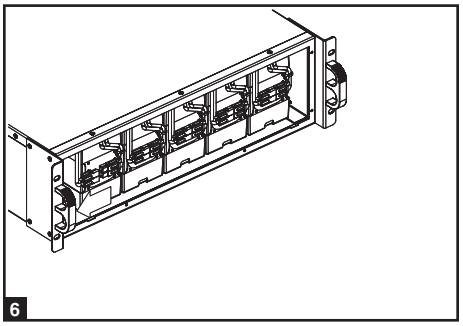


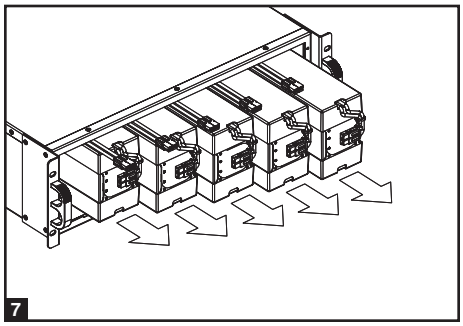












13 – Warranty

Limited Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship for a period of 2 years from the date of initial purchase. If the product should prove defective in material or workmanship within that period, Seller will repair or replace the product, in its sole discretion. Service under this Warranty includes parts and Tripp Lite service center labor. On-site service plans are available from Tripp Lite through authorized service partners (in most areas). Contact Tripp Lite Customer Service at +1.773.869.1234 for details. International customers should contact Tripp Lite support at intlservice@tripplite.com.

THIS WARRANTY DOES NOT APPLY TO NORMAL WEAR OR TO DAMAGE RESULTING FROM ACCIDENT, MISUSE, ABUSE OR NEGLECT. SELLER MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY EXPRESSLY SET FORTH HEREIN. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ALL IMPLIED WARRANTIES, INCLUDING ALL WARRANTIES OF MERCHANTABILITY OR FITNESS, ARE LIMITED IN DURATION TO THE WARRANTY PERIOD SET FORTH ABOVE; AND THIS WARRANTY EXPRESSLY EXCLUDES ALL INCIDENTAL AND CONSEQUENTIAL DAMAGES. (Some states do not allow limitations on how long an implied warranty lasts, and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This Warranty gives you specific legal rights, and you may have other rights which vary from jurisdiction to jurisdiction.)

Tripp Lite
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Chicago, IL 60609 USA

WARNING: The individual user should take care to determine prior to use whether this device is suitable, adequate or safe for the use intended. Since individual applications are subject to great variation, the manufacturer makes no representation or warranty as to the suitability or fitness of these devices for any specific application.

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your Tripp Lite product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to the series number. The series number should not be confused with the marking name or model number of the product.

WEEE Compliance Information for Tripp Lite Customers and Recyclers (European Union)

Under the Waste Electrical and Electronic Equipment (WEEE) Directive and implementing regulations, when customers buy new electrical and electronic equipment from Tripp Lite they are entitled to:

- Send old equipment for recycling on a one-for-one, like-for-like basis (this varies depending on the country)
- Send the new equipment back for recycling when this ultimately becomes waste

Tripp Lite has a policy of continuous improvement. Specifications are subject to change without notice.

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